GIANTS FOR RENT

Computer Efficiency Without Capital Investment—from The Data Centers of CONTROL DATA CORPORATION


CONTROL DATA
COMPUTER SYSTEM
3600

Computers these days are becoming gigantic. Biggest of all is Control Data's super-giant, the renowned 6600. Before that, the biggest on the market was our 3600. Both may be bigger than you'll ever want to lease or own. But don't let such bigness stop you. Such giants can be invaluable to you, even when you use them only a few minutes at a time.

This book shows you how. It tells you how you can work effectively with the biggest computers of our time.

Don't Let the Giants Fool You

Computer systems these days may be gigantic. But these super-giants must not obscure a fact that's important:

> You don't have to be a super-giant yourself to benefit from the efficiency and savings that come from letting today's greatest computers do your paperwork and time-consuming figuring.

To permit you and organizations like yours to be as up-to-date as the biggest firms, institutions, and governmental units in the world, Control Data has established Data Centers, where processing and computation are yours for rent. Not computers leased, housed and operated by you. Computers by the hour, housed and operated for your purposes, by us.

IF YOUR NEEDS ARE SMALL: Smaller and smaller firms and institutions are finding in time-rental from a Data Center their answer to handling data processing and computation with a fast electronic computer. "Don't buy it, just use it" is a motto that comes to their rescue.

FOR BIG ONES, TOO: The same idea works for organizations of considerable size. Firms or institutions with computers of their own often use ours as well. At least two of them are computer manufacturers themselves. There's no foreseeing when extra core-capacity —like 131,000 48-bit words in a CONTROL DATA® 3600—may be a computational life-saver. Or a customer's own computers may just be busy. For reasons like these, they turn to their nearby Data Centers. Don't buy or build another. Just use one.

HOW ABOUT YOU? You can modernize, simplify, and speed up your procedures, without the investment in equipment and personnel needed for even a small computer. Consult the Data Center nearest to you about how renting a computer can help. Not year-round. Just when you want it.

What Matters Most to You

When you're deciding to turn to time-rental for answering your own computer needs, there are always two factors important to consider: What are the facilities available to you—the computer systems with all the programs and documentation needed to handle your assignments? And how are they operated for your benefit? Capacity and control. As a user of time-rental service, these are what count for you.

CAPACITY: Speaking of super-giants, everyone knows who is the Goliath of the computer business. Those three letters are very widely known. Hence people tend to forget who has come up with the most powerful computers in the field. Not publicity but products. Not Goliath but the firm that started out as Little David: Control Data and its 6000 Series computers.

In the same way, few people realize who offers the most powerful time-rental services of all. Perhaps Not-So-Little David should harp on it. As with computers for lease or sale, so with computers for rent. The biggest and most complete are supplied by the Data Centers of Control Data.

If you know computers, you'll welcome the fact that most Data Centers offer you use of CONTROL DATA® 3600's. (Those that don't, have 1604's and/or 160-A's. They reach the 3600's when needed, by DATAphone.*) You'll be pleased to remember that most 3600's have core memories of 65,000 48-bit words and to learn that the one in Minneapolis has 131,000. (It, too, is available nationwide by DATAphone.) If you're just learning about computers, simply remember this: Until we introduced the 6600, the 3600 was the most powerful computer on the market. It's at your service.

As this is being written, capacity of our large-scale Data Center computers adds up to approximately 1,900,000 instructions per second.** This represents more computer power than is offered by the large-scale facilities of the two next-largest time-rental concerns put together. And our Data Centers are continuing to grow.

AND DON'T FORGET SOFTWARE. The standard operating systems and compilers and assemblers such as FORTRAN, COBOL, etc., are available, of course, on Data Center computers. Computer programs are also available for general business purposes, for scientific computation, and for manufacturing, engineering or other special purposes. These, with instruction manuals, input forms and other documentation make your use of our services quick and easy, Several available systems are described on page 10.

CONTROL: Strictly speaking, control is the procedure which sees to it that your processing and computing jobs are handled smoothly and efficiently. It makes sure that all the tasks making up a job are properly performed and that tapes, cards, print-outs, etc., are properly handled. It makes certain that your work comes back to you on time, in good form and without error, every time you commit it to your Data Center.

Your job may be delivered to us and taken back in person, sent by taxi, shipped by airmail or express. It can travel by DATAphone or be punched into paper tape by teletypewriter. No matter how it comes and goes, while in the Center it is scheduled and followed through in a way we're sure you'll like. That's the basic meaning of control. It saves you headaches. It saves you money.

When you need it, this service works for you around the clock. If your job can't be fitted into the computer's schedule during the working day, it goes into a night-time run. There's no extra charge for this service. It's just an added assurance you can rely upon. It's another aspect of our operational control.

In a broader sense, control starts long before your first job goes through the door to be logged and checked and started. It includes the instruction you get from a manual, the standardization of input forms for whatever program you want to run. It includes the attention you get from a Data Center salesman, the explanation he gives you of our procedures, the guided tour he can give you of our facilities like the one that a customer is getting in pictures shown through this book.

As we've said, there's tremendous capacity at your service in the network of Data Centers at Control Data. You'll appreciate that capacity for the jobs it lets your own Center do for you. In addition, you'll also value control, for the way that it gets those jobs done.

*Trademark of American Telephone and Telegraph Co.
**Based on the "Gibson Mix" derived for scientific problems.

At your Data Center, each job is assigned to the Control Data computer best suited to handling it effectively and economically, ranging from the super-giant of them all, the world's-largest 6600, through the 3600 or 3200 or 1604, to the desk-sized little giant, the 160-A.

A customer's data cards are received for processing.

Your Data Centers representative confers with you on your needs.

Visit your Data Center and see for yourself.

Above: Details are worked out with your representative and a section leader assigned to your account. Right: You are instructed in coding, control sheets, and operating instructions for your jobs.

Data and program instructions are punched onto cards.

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PROCEDURE DIVISION.
DECLARATIVES.
U-MI SECTION. USE AFTER STANDARD ERROR PROCEDURE ON MASTER-INPUT.
PARA-1.  PERFORM M-DISP.  MOVE ZEROS  TO P-TAPE.
U-D180 SECTION. USE AFTER STANDARD ERROR PROCEDURE ON
                    D-ENTRY-180.
PARA-2.  PERFORM D-DISP. MOVE ZEROS TO P-TAPE.
END DECLARATIVES.
X-START. OPEN INPUT D-ENTRY-180. READ D-ENTRY-180 AT END GO TO
         X-HALT.  MOVE ZEROS TO F-TYPE-A   MOVE ZEROS TO
           F-TYPE-D.   OPEN OUTPUT  L-OUTPUT.  OPEN OUTPUT
         W-ERROR-BUFFER.  MOVE SPACES TO L-RECORD.
         IF D-SHIFT IS EQUAL TO 01 ADD 1 TO D-DAY.
                        MOVE D-DAY TO Z1-DAY Z1-L-DAY  MOVE
         ZEROS TO  LST-D-WR.
X-E-HD. MOVE Z1-MES-E TO ERROR-BUFFER.  WRITE ERROR-BUFFER.
             MOVE  D-DAY TO S-DATE-O    SUBTRACT  1  FROM  D-DAY
             GIVING  S-DATE-I.
         IF D-DAY IS NOT EQUAL TO  1  GO TO X-ASK OTHERWISE GO
         TO X-NO-I.
M-DISP. DISPLAY -PAR ER ON LOG 01  DEPT -  I-DEPT-98  -  EMP -
            I-EMPLOYEE-98.
D-DISP. DISPLAY -PAR ER ON LOG 03  DEPT - D-DEPT  -  EMP -
            D-CLOCK-NO.
X-ASK.  DISPLAY -SHALL I READ PAYROLL-MASTER-. ACCEPT YES-OR-NO.
         IF YES-OR-NO IS EQUAL TO H-H-ANS GO TO X-OPEN-I.
         IF YES-OR-NO IS EQUAL TO H-MY-ANSWER GO TO
         X-NO-I ELSE DISPLAY -YOU GOOFED- GO TO X-ASK.
X-NO-I.    MOVE 7 TO F-FIRST-DAY  DISPLAY
         -THIS COMING SATURDAY S DATE IS -  ACCEPT  MONTH-IS
          ACCEPT DAY-IS   ACCEPT  YEAR-IS
         OPEN INPUT PAY-MAS. READ PAY-MAS. PERFORM  X-RD-MS
           THRU X-RM1. GO TO X-OPEN-O.
X-OPEN-I. OPEN INPUT MASTER-INPUT. READ MASTER-INPUT AT END GO TO
             X-INPUT-EOF.
         MOVE  I-MONTH-98 TO  MONTH-IS   MOVE  I-DAY-98  TO
          DAY-IS   MOVE  I-YEAR-98  TO YEAR-IS.
X-OPEN-O. OPEN OUTPUT MASTER-OUTPUT.
             MOVE D-ENTRY-O  TO  W-ENTRY-O  MOVE  I-RECORD
             TO O-RECORD         GO TO X-BEGIN.
X-INPUT-EOF.  MOVE 7 TO  F-I-EOF   GO TO  X-OPEN-O.
X-S-ER. MOVE D-DEPT TO E-DEPT  MOVE D-CLOCK-NO TO E-N MOVE
         ERRORS TO ERR-FST.
X-BEGIN.    IF  F-D-EOF  IS NOT EQUAL TO 0  GO TO X-END.
         IF F-FIRST-DAY IS NOT EQUAL TO 0 GO TO X-B1.
         IF F-I-EOF IS NOT EQUAL TO 0 GO TO X-CREATE.
X-B1.    MOVE D-DEPT TO O-D-DEPT MOVE D-CLOCK-NO TO O-D-CLOCK-NO.
         IF D-HANDLE IS EQUAL TO O-HANDLE-98 GO TO
         X-CLOCKIN OTHERWISE IF O-HANDLE-98 IS GREATER THAN
         D-HANDLE GO TO X-CREATE ELSE NEXT SENTENCE.
         IF F-FIRST-DAY IS NOT EQUAL TO 0 GO TO X-WRITE-O.
         IF O-PACO-98 IS EQUAL TO 02 GO TO X-WRITE-O.
          MOVE SPACES TO L-RECORD    MOVE O-DEPT-98 TO CUR-D-WR.
        PERFORM  X-ACCUM THRU X-ACC-EX.
         MOVE O-EMPLOYEE-98 TO L-CLOCK PERFORM X-ON-L THRU
         X-ON-EXIT.  MOVE SPACES TO L-RECORD. PERFORM  X-ON-L
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           X-CLOCKIN OTHERWISE IF O-HANDLE-98 IS GREATER THAN
           D-HANDLE GO TO X-CREATE ELSE NEXT SENTENCE.
           IF F-FIRST-DAY IS NOT EQUAL TO 0 GO TO X-WRITE-O.
           IF O-PACO-98 IS EQUAL TO 02 GO TO X-WRITE-O.
            MOVE SPACES TO L-RECORD    MOVE O-DEPT-98 TO CUR-D-WR.
         PERFORM  X-ACCUM THRU X-ACC-EX.
           MOVE O-EMPLOYEE-98 TO L-CLOCK PERFORM X-ON-L THRU
           X-ON-EXIT.  MOVE SPACES TO L-RECORD. PERFORM  X-ON-L
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           THRU X-ON-EXIT.  IF O-DEPT-98 IS GREATER-EQUAL TO 202
           ADD O-R-HOURS-98 TO F-WK-TOT  ELSE NEXT SENTENCE.
           IF Z1-DAY IS NOT EQUAL TO 7 PERFORM X-LOSTT THRU
           X-LO-F ELSE NEXT SENTENCE.
X-WRITE-O. MOVE MONTH-IS TO O-MONTH-98   MOVE  DAY-IS  TO
           O-DAY-98     MOVE  YEAR-IS  TO  O-YEAR-98.
           WRITE O-RECORD. MOVE  ZEROS TO F-TYPE-A. MOVE
           O-HANDLE-98 TO  D-HANDLE    MOVE
           ZEROS  TO O-RECORD.   MOVE SPACES TO
           L-RECORD   IF F-I-EOF IS EQUAL TO 0 GO TO
           X-CHECK-I-IGNORE  OTHERWISE IF F-D-EOF IS NOT EQUAL TO 0
           GO TO X-CLOSE  OTHERWISE GO TO X-CREATE.
X-CHECK-I-IGNORE. IF F-I-IGNORE IS NOT EQUAL TO 0 MOVE 0 TO
           F-I-IGNORE GO TO X-MOVE-I-TO-O.  IF F-FIRST-DAY IS NOT
           EQUAL TO 0 PERFORM X-RD-MS THRU X-RM1 GO TO X-CIG1.
           READ MASTER-INPUT  AT END GO TO  X-SET-I-EOF.
X-CIG1.  IF I-HANDLE-98 IS GREATER THAN  D-HANDLE  GO TO
           X-MOVE-I-TO-O   OTHERWISE     DISPLAY
            -INPUT TAPE NOT SORTED CORRECTLY  TERMINATE RUN-.
X-MOVE-I-TO-O.  MOVE I-RECORD TO O-RECORD  GO TO  X-BEGIN.
X-SET-I-EOF.  MOVE 7  TO  F-I-EOF.
           IF F-D-EOF IS NOT EQUAL TO 0 GO TO X-CLOSE.
X-CREATE.  MOVE ALL 9 TO  O-A-98.  MOVE ZEROS TO O-RATE-98
           O-R-HOURS-98.  MOVE D-DEPT TO O-DEPT-98.  MOVE D-CLOCK-NO
           TO O-EMPLOYEE-98.  MOVE O-A-98 TO O-A-97 O-A-96
           O-A-95.  MOVE 998 TO O-ACCT-98  MOVE 997 TO O-ACCT-97
           MOVE 996 TO O-ACCT-96  MOVE 995 TO O-ACCT-95.  MOVE
           ALL 9 TO O-2.
X-F-I-G.  MOVE  7 TO  F-I-IGNORE  GO TO  X-CLOCKIN.
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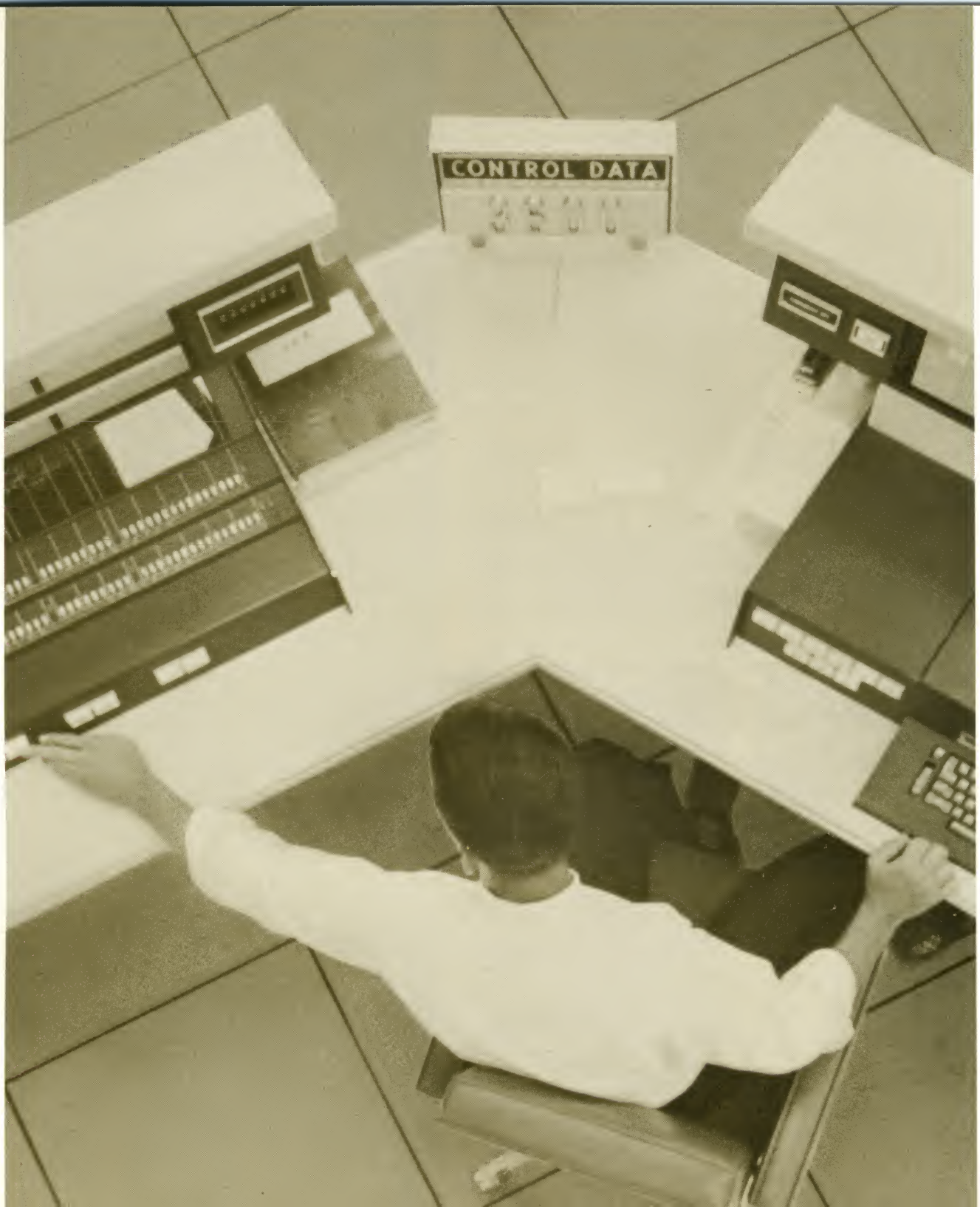
All data from cards is transferred to magnetic tapes.

Your work is then run on the appropriate computer like the 3600 here or . . .

. . . the 160-A shown here.

Your finished work is printed out at 1,000 lines a minute.

Your data for future use is filed on magnetic tapes.


CONTROL DATA

Control Data's T/P program, a completely integrated system for transportation planning, exemplifies specialized services available at Data Centers.

The Program for Your Purpose

Your own benefit from the use of computer-time at your Data Center depends on the type of activity in which you are engaged. General business procedure? Manufacturing? Scientific computation? Engineering? Or some special area, such as biomedicine or schoolroom scheduling. In whatever you and your associates are doing, Control Data can work with you toward new levels of efficiency.

Here is a listing of the types of program available to you. Others are being added to our libraries all the time.

GENERAL BUSINESS PROCEDURES: Here we generally tailor a program to your exact needs and present procedures. Your *payroll,* for example, will be programmed to suit your own record-keeping and your paychecks printed according to whatever format you have always used or any other you may care to adopt. In the same way, we can work out your *invoicing* or *inventory control,* your *personnel records* and your *accounts payable or receivable,* or your more specialized programs such as *sales analyses.*

MANUFACTURING: *Product scheduling, machine loading,* or the *optimum locating of plants, inventories and distribution* routes are among the factors that can be computerized by the manufacturer who wants his operations run with modern efficiency. Ask your salesman about *linear programming, integer linear programming, network flow* and other optimization procedures that can be to your advantage.

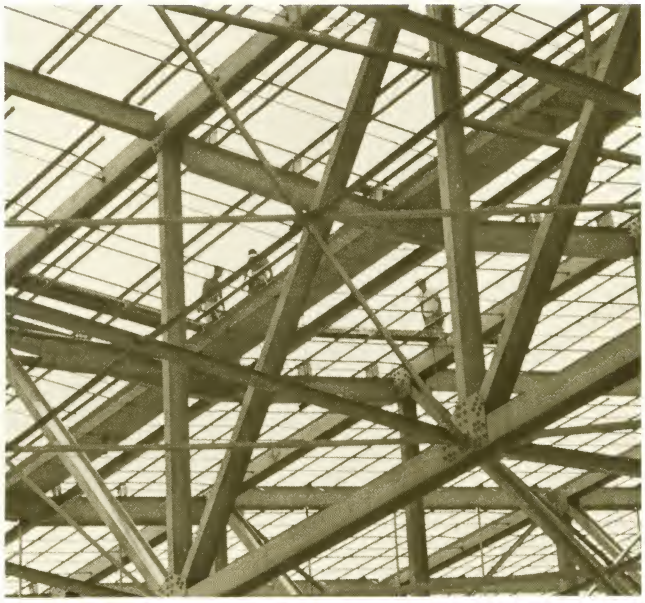
SCIENTIFIC COMPUTATION: Here the speed of the 3,000-series computer systems is especially valuable. For all the systems offered to you at Data Centers, FORTRAN compilers are available. Moreover, even when machine language is used instead of FORTRAN, Control Data assemblers and operating systems provide your programmers with valuable assistance.

ENGINEERING: The scope of programs at our Data Centers for use in engineering is exceptionally complete. It ranges from CIVCO which can save you many man-hours in the routine computations of *geometry* for civil engineering through CPM for the scheduling of large projects, especially in construction, Swedish Slip Circle which computes the characteristics of *embankments,* or Multi-story Frame Analysis for buildings to such specialized systems as T/P which assists highway departments in *transportation planning.*

SPECIAL AREAS: Questionnaire Analysis. Schoolroom Scheduling. Load Flow for Electric Power Networks. Water Network Analysis.

YOUR OWN: These examples give you some idea of the versatility of our Data Center services for answering your specific needs. A discussion with your Data Center's salesman will establish how those needs can best be met.

Machine scheduling is one of many procedures improved with linear programming.



Any major project can be better planned with Control Data's critical path method.

Let your Data Center representative show you what computerization can do for you.

Your Data Center is as near as your DATAphone, WATS line, or TWX.

Where Better Service Cuts Your Costs

It's hard or even impossible to think of any other situation where a better product or deluxe service costs you less than one of less quality. Such, however, is the situation at the Data Centers of Control Data. Service from the most powerful computers anywhere available for time-rental often costs you less than service from machines less powerful than the 1604's and the 3600's we use to do your data processing.

It's not that we're big-hearted or generous. The low rental costs at our Data Centers simply reflect a basic fact—that when you're renting computer time, cost per job is inversely related to the computing power of equipment you use. The fast throughput provided by high-powered computers in your Data Center means lower cost to you.

The control we've already discussed also means not only better service but money saved. Efficient scheduling eliminates wasted time. Charges do not have to allow for computers standing idle when another job is ready for them. The specialists who get your job started on time and finished on time are saving you money in the process.

How Fast, How Near Do You Want Us?

We've mentioned already that whether or not the Data Center in your immediate area has a 3600 computer, you have access to one through DATAphone* service. No matter where you are, in fact, you're within reach of the most powerful time-rental computer in the country, the 3600 in Minneapolis with its 131,000 48-bit words.

Even if you don't need this unequalled capacity or even a 3600 with 65,000 words, data communication can be valuable to you. No matter how small your needs for computer service, you may want to deal with your Data Center from a distance. One example will show what we mean:

A young and aggressive firm with 500 employees manufacturing welding equipment is alert to the efficiency of electronic data processing but not ready yet to lease or buy a computer. They are 300 miles from their nearest Data Center. How do they obtain a daily labor distribution report on their activities and, incidentally, computerized handling of their payroll?

It's almost as simple as if the computers which handle this were on their own premises. Employees simply enter the time they spend on each job into Control Data® 180 Data Collectors which punch it into paper tapes. The tapes are collected at the end of each day and transmitted automatically by a Teletype* unit over the company's WATS* line. At their Data Center, the data comes in on another paper tape and is transferred to magnetic tape. Processing is done on the 3600, and the labor distribution report is printed out and sent by air to the customer. In this way, management and supervisors have their reports by eleven each morning for work done the day before. Then at the end of each pay period, a payroll and checks are computed and printed on the basis of data accumulated on the magnetic tapes.

Whatever procedure you yourself may want to adopt, remember that you can always transmit your data over phone or radio circuits. Your Data Center is as near as your DATAphone.

*DATAphone, Teletype and WATS are registered trademarks of American Telephone and Telegraph Company.

A brochure such as this can give you only a briefing on how Data Centers are proving useful to others. What matters, however, is you. Just remember: your Data Center can be of value to you whether your needs for electronic data processing and computation are small or big, general or highly specialized. Tell your Data Center representative what they are, and let him tell you how your Data Center can meet them. Telephone or write to your Data Center as listed on the following page.

Data Centers in:

NEW YORK: Manhattan: 575 Lexington Avenue, New York City 10022 Tel. 212—PL 2-3840; Long Island: 295 Northern Boulevard, Great Neck, Long Island 11021 Tel. 212—TU 6-0411 • CINCINNATI: Central Trust Bank Building, 3300 Central Parkway, Cincinnati, Ohio Tel. 513—541-5883 • CHICAGO: 223 West Jackson Boulevard, Chicago, Ill. 60606 Tel. 312—922-5767 • WASHINGTON: 11428 Rockville Pike, Rockville, Md. 20852 Tel. 301—949-8800 • MINNEAPOLIS: 8100 34th Avenue South, Minneapolis, Minn. 55440 Tel. 612—888-5555 • HOUSTON: 7015 Gulf Freeway, Houston, Texas 77025 Tel. 713—MI 4-2221 • LOS ANGELES: 5630 Arbor Vitae, Los Angeles, Calif. 90045 Tel. 213—776-2220 • SANTA BARBARA: 6300 Hollister Avenue, Goleta, Calif. Tel. 805—964-3571 • SAN FRANCISCO: 3330 Hillview Avenue, Palo Alto, Calif. 94304 Tel. 415—321-8920 • FRANKFURT-AM-MAIN: Niddastrasse 40, 6 Frankfurt Am Main 1, Germany Tel. 25 30 61


EXIT

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8100 34th AVENUE SOUTH
MINNEAPOLIS, MINN. 55440

CONTROL DATA
CORPORATION

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